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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,406	09/21/2005	Christine E. Krohn	2003UR016	2261

7590 06/05/2007  
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EXAMINER
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HUGHES, DEANDRA M

ART UNIT	PAPER NUMBER
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3663

MAIL DATE	DELIVERY MODE
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06/05/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/550,406

**Applicant(s)**

KROHN, CHRISTINE E.

**Examiner**

Deandra M. Hughes

**Art Unit**

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 8, 11 and 26-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-10, 12-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/21/05</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The amendment filed 4/12/07 has been entered. However, the Examiner objects to the minor informality of newly renumbered claims 46-47. *Applicant may not amend the claim numbers rather; the text of the claim itself must be amendment.* For example, the 2<sup>nd</sup> instance of claim 45 should have been cancelled, old claim 46 should have been amended with the text of the 2<sup>nd</sup> instance of claim 45 and claim 47 should be added as a new claim. Since amendments to claim numbers themselves are improper, they are not processed when the allowed patent is published. Consequently, correction is required.

### ***Election/Restrictions***

2. Applicant's election with traverse of Species A in the reply filed on 4/12/07 is acknowledged. The traversal is on the ground(s) that "nothing in the disclosure relating to these two flowcharts suggests that they cannot be 'linked to form a general inventive concept' (pg. 2, lines 12-13). This is not found persuasive because figure 2 discloses a continuous method of processing seismic data and figure 4 discloses a discrete method of processing data. A discrete mathematical process such as a matrix is inherently not a continuous mathematical process. Therefore, Species A and Species B are mutually exclusive.

Further, Applicant's amendments to the claims resulted in claims 8 and 11 reading upon non-elected Species B. Accordingly, claims 8, 11, and 26-47 are withdrawn from consideration.

The requirement is still deemed proper and is therefore made FINAL.

***Information Disclosure Statement***

3. The information disclosure statement (IDS) filed on 9/21/05 has been considered by the examiner and is found to be cumulative to the art of record. However, ITEM #23 was not considered because only the title page of the reference was submitted.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-7, 9-10, 12-15, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Trantham (US 5,400,299 published Mar. 21, 1995) in view of Allen (US 5,550,786 published Aug. 27, 1996)

With regard to claims 1-2, 10, and 22, Trantham discloses a method of processing seismic data generated by a seismic vibrator comprising the steps of (fig. 1):

- computing a vibrator signature (#100);
- specifying a desired seismic data processing impulse response (#110), wherein the high and low frequency portions of an amplitude spectrum of said impulse response taper to zero at a rate faster than does the high and low frequency portions of an amplitude spectrum of said vibrator signature (by definition, an impulse response is instantaneous therefore,

the high a low frequency portions of an impulse response will inherently taper to zero faster);

- computing a deconvolution filter from the ratio of the desired impulse response and the computed vibrator signature (#120) and
- processing said seismic data using said deconvolution filter (#130).

However, Trantham does not specifically disclose measuring a signal relating to the vibrator motion and computing a vibrator signature based on the said measured signal. Allen teaches measuring and pre-processing vibratory source data (i.e., vibrator ground force signal; col. 2, line 65; fig. 1, D1-D4) for the advantage of removing noise from the seismic data (entire patent but for specificity, see col. 2, lines 22-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to measure and pre-process the vibratory source data for the advantage of removing noise from the seismic data.

With regard to claim 3, Trantham discloses s sweep signal (fig. 2, #200).

With regard to claims 4-5, Trantham discloses shaped sweep methods (col. 8, lines 45-55).

With regard to claim 6, the last line of Trantham's abstract discloses computations in the time domain.

With regard to claim 7, the selection of the Impulse filter (e.g. fig. 3, #310) involves an analysis of the suitability of the deconvolution filter.

With regard to claim 9, Trantham does not specifically disclose adding a small amount of whitening noise to the impulse response. However, Allen teaches adding

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spectral whitening noise to the frequency values (fig. 2, #64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add spectral whitening noise to the seismic data for the advantage of removing monochromatic noise.

With regard to claims 12-15, Trantham discloses that it is well known in the art to increase or decrease the frequency sweep of the vibrator source both linearly and nonlinearly (col. 2, lines 55-65).

6. Claims 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Trantham in view of Allen '786 as applied to claim 10 above, and further in view of Allen (US 5,822,269 filed Oct. 13, 1998).

With regard to claims 16-21, Trantham in view of Allen '786 does not specifically disclose a multiplicity of vibratory sources with the claimed phase relations. However, Allen '269 teaches a multiplicity of vibratory sources with the claimed phase relationships (e.g., see Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the multiplicity of vibratory sources with the claimed phase relationships as is taught by Allen for the advantage of improving the imaging based on the seismic data.

7. Claims 23-25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Trantham in view of Wiggins (US 4,688,198 published 8/18/1987).

With regard to claims 23-24, Trantham does not specifically disclose apply normal move out corrections. However, Wiggins teaches normal moveout correction and gather the data into sets to facilitate and improve seismic data collection (col. 2,

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lines 40-45; col. 3, lines 5-10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use NMO for the advantage of improved seismic data.

Further, in claim 24, please note that the phrase “to improve the noise separation techniques” is given no patentable weight because it is merely an intended outcome and not a method limitation.

With regard to claim 25, Trantham does not specifically disclose speearting the data into bins. However, Wiggins teaches separating the data into bins for the advantage of producing a modified observed signal (col. 5, lines 40-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the data into bins to produce a modified observed signal for the advantage of improving the seismic data.

Further, in claim 25, please note that the phrase “improving imaging and focusing” is given no patentable weight because it is merely an intended outcome and not a method limitation.

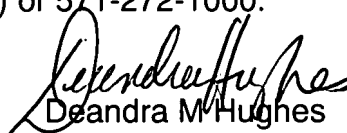
### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M. Hughes whose telephone number is 571-272-6982. The examiner can normally be reached on M-F, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Deandra M. Hughes  
Primary Examiner  
Art Unit 3663